

## PATENT

Atty. Dkt. No. APPM/007868.P3/PPG/EC/CKIM

## IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) An electrochemical plating cell, comprising:  
a fluid basin for plating having an anolyte solution compartment and a catholyte solution compartment;  
a membrane support an ionic membrane positioned between the anolyte solution compartment and the catholyte solution compartment, the membrane support having an ionic membrane comprising a poly tetrafluoroethylene based ionomer coupled therewith; and  
an anode positioned in the anolyte solution compartment; ~~and~~  
~~— a diffusion member positioned in the catholyte compartment, wherein the ionic membrane comprises a poly tetrafluoroethylene based ionomer.~~
2. (Original) The electrochemical plating cell of claim 1, wherein the ionic membrane further comprises a cationic membrane based on a fluorized polymer matrix.
3. (Original) The electrochemical plating cell of claim 1, wherein the ionic membrane includes a fluorized matrix configured to be chemically stable in both acidic and concentrated basic solutions.
4. (Original) The electrochemical plating cell of claim 1, wherein the ionic membrane comprises a perfluorinated polymer containing at least one of sulfonic and carboxylic ionic functional groups.
5. (Original) The electrochemical plating cell of claim 4, wherein the ionic membrane is configured to transmit between about 94% and about 98% of metal ions therethrough at plating current densities of between about 5 mA/cm<sup>2</sup> and about 20 mA/cm<sup>2</sup>.

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6. (Original) The electrochemical plating cell of claim 4, wherein the ionic membrane is configured to transmit between about 93% and about 97% of metal ions therethrough at plating current densities of between about 20 mA/cm<sup>2</sup> and about 60 mA/cm<sup>2</sup>.

7. (Original) The electrochemical plating cell of claim 2, wherein the ionic membrane comprises a conductivity of between about 20 ohm cm<sup>2</sup> and about 45 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup>.

8. (Original) The electrochemical plating cell of claim 7, wherein the ionic membrane comprises a conductivity of between about 20 ohm cm<sup>2</sup> and about 30 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup>.

9. (Original) The electrochemical plating cell of claim 2, wherein the ionic membrane comprises a water transfer of between about 3 ml/Amphr and about 7.5 ml/Amphr.

10. (Original) An electrochemical plating cell ~~The electrochemical plating cell of claim 4, comprising:~~

a fluid basin for plating having an anolyte solution compartment and a catholyte solution compartment;

a membrane support positioned between the anolyte solution compartment and the catholyte solution compartment, the membrane support having an ionic membrane comprising wherein the ionic membrane comprises a polydivinylbenzol matrix coupled therewith; and

an anode positioned in the anolyte solution compartment.

11. (Currently Amended) An electrochemical plating cell, comprising:  
an anolyte compartment configured to contain an anolyte solution;  
a catholyte compartment configured to contain a catholyte solution for plating a metal onto a substrate;

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a membrane support ~~cationic membrane~~ positioned to separate the catholyte compartment from the anolyte compartment, the membrane support having a cationic membrane comprising a fluorized polymer matrix coupled therewith; and  
an anode positioned in the anolyte compartment; and  
~~a diffusion member positioned in the catholyte compartment between the cationic membrane and a substrate plating position,~~  
wherein the ~~cationic membrane~~ includes a fluorized polymer matrix.

12. (Original) The electrochemical plating cell of claim 11, wherein the cationic membrane comprises a poly tetrafluoroethylene based ionomer.

13. (Original) The electrochemical plating cell of claim 12, wherein the cationic membrane comprises a perfluorinated polymer containing at least one of sulfonic and carboxylic ionic functional groups.

14. (Original) The electrochemical plating cell of claim 13, wherein the cationic membrane is configured to transmit between about 94% and about 98% of metal ions therethrough at plating current densities of between about 5 mA/cm<sup>2</sup> and about 20 mA/cm<sup>2</sup>.

15. (Original) The electrochemical plating cell of claim 13, wherein the ionic membrane is configured to transmit between about 93% and about 97% of metal ions therethrough at plating current densities of between about 20 mA/cm<sup>2</sup> and about 60 mA/cm<sup>2</sup>.

16. (Original) The electrochemical plating cell of claim 13, wherein the cationic membrane comprises a conductivity of between about 20 ohm cm<sup>2</sup> and about 45 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup>.

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17. (Original) The electrochemical plating cell of claim 16, wherein the ionic membrane comprises a conductivity of between about 20 ohm cm<sup>2</sup> and about 30 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup>.
18. (Currently Amended) An electrochemical plating cell, comprising:  
an anolyte compartment positioned in a lower portion of a fluid basin;  
a catholyte compartment containing a plating solution and being positioned in an upper portion of the fluid basin where substrates are plated; and  
a membrane support having a poly tetrafluoroethylene based ionomer cationic membrane coupled therewith ~~having a fluorized polymer matrix~~ the membrane support positioned to separate the anolyte compartment from the catholyte compartment.
19. (Original) The electrochemical plating cell of claim 18, further comprising a diffusion member positioned above the cationic membrane in the catholyte compartment.
20. (Original) The electrochemical plating cell of claim 19, wherein the diffusion member is a porous ceramic disk having a uniform thickness.
21. (Original) The electrochemical plating cell of claim 18, wherein the cationic membrane is configured to transmit between about 94% and about 98% of metal ions therethrough at plating current densities of between about 5 mA/cm<sup>2</sup> and about 20 mA/cm<sup>2</sup> and between about 93% and about 97% of metal ions therethrough at plating current densities of between about 20 mA/cm<sup>2</sup> and about 60 mA/cm<sup>2</sup>.
22. (Original) The electrochemical plating cell of claim 18, wherein the cationic membrane has a conductivity of between about 20 ohm cm<sup>2</sup> and about 45 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup> and between about 20 ohm cm<sup>2</sup> and about 30 ohm cm<sup>2</sup> at a plating current density of about 10 mA/cm<sup>2</sup>.

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23. (Original) The electrochemical plating cell of claim 18, wherein the cationic membrane has a water transfer of between about 3 ml/Amphr and about 7.5 ml/Amphr.

24. (New) The electrochemical plating cell of claim 1, further comprising:  
a diffusion member positioned in the catholyte compartment.

25. (New) The electrochemical plating cell of claim 11, further comprising:  
a diffusion member positioned in the catholyte compartment between the cationic membrane and a substrate plating position.